Climate, wetland invertebrate communities, and breeding shorebirds



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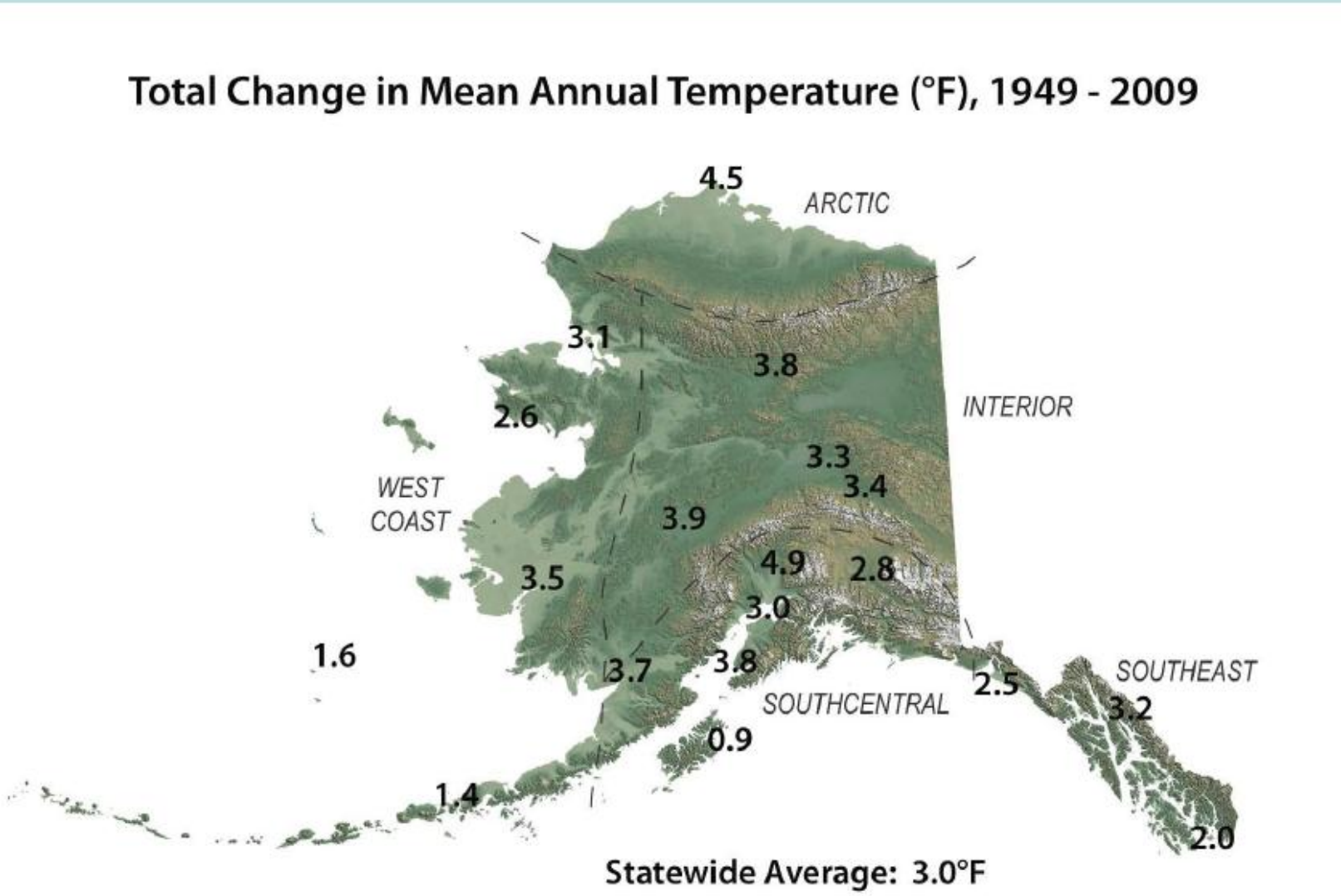
UAF UNIVERSITY OF ALASKA FAIRBANKS

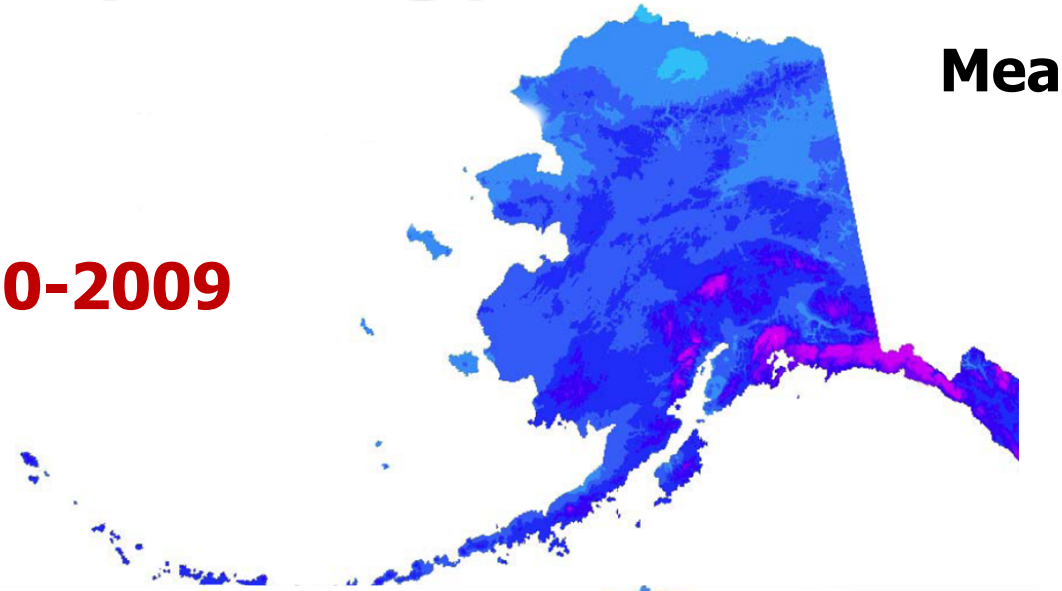
Alaska Shorebird Group Meeting, 08 December 2011

Temperature change in Alaska, 1949-2009

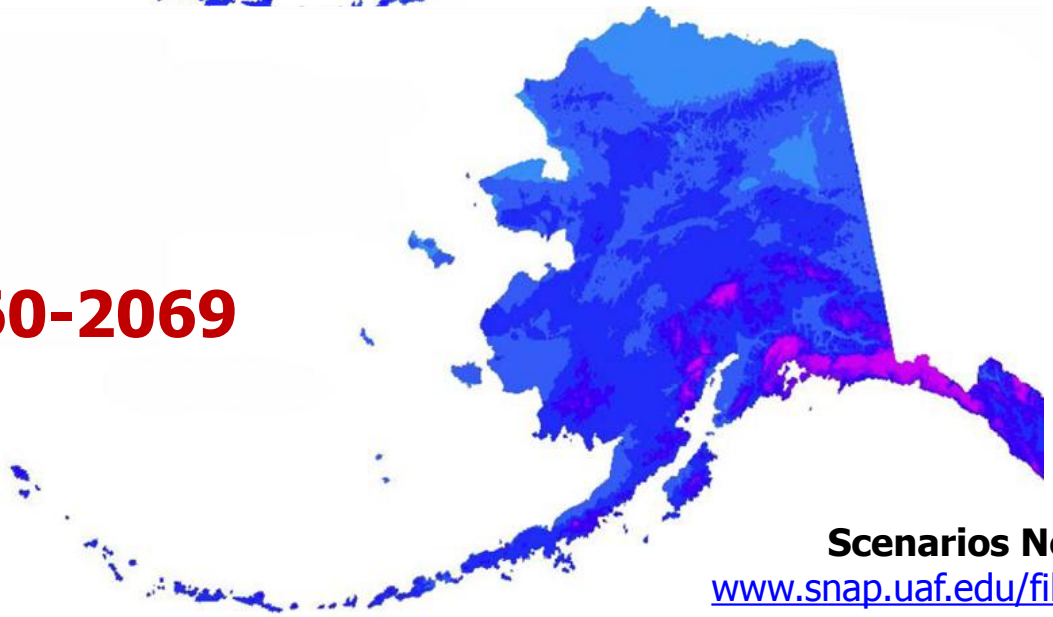
[from Alaska Climate Research Center]



Climate change is expected to alter the hydrology of Alaska's north slope

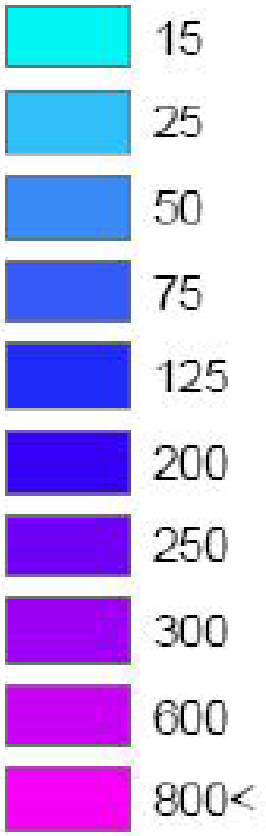


2000-2009

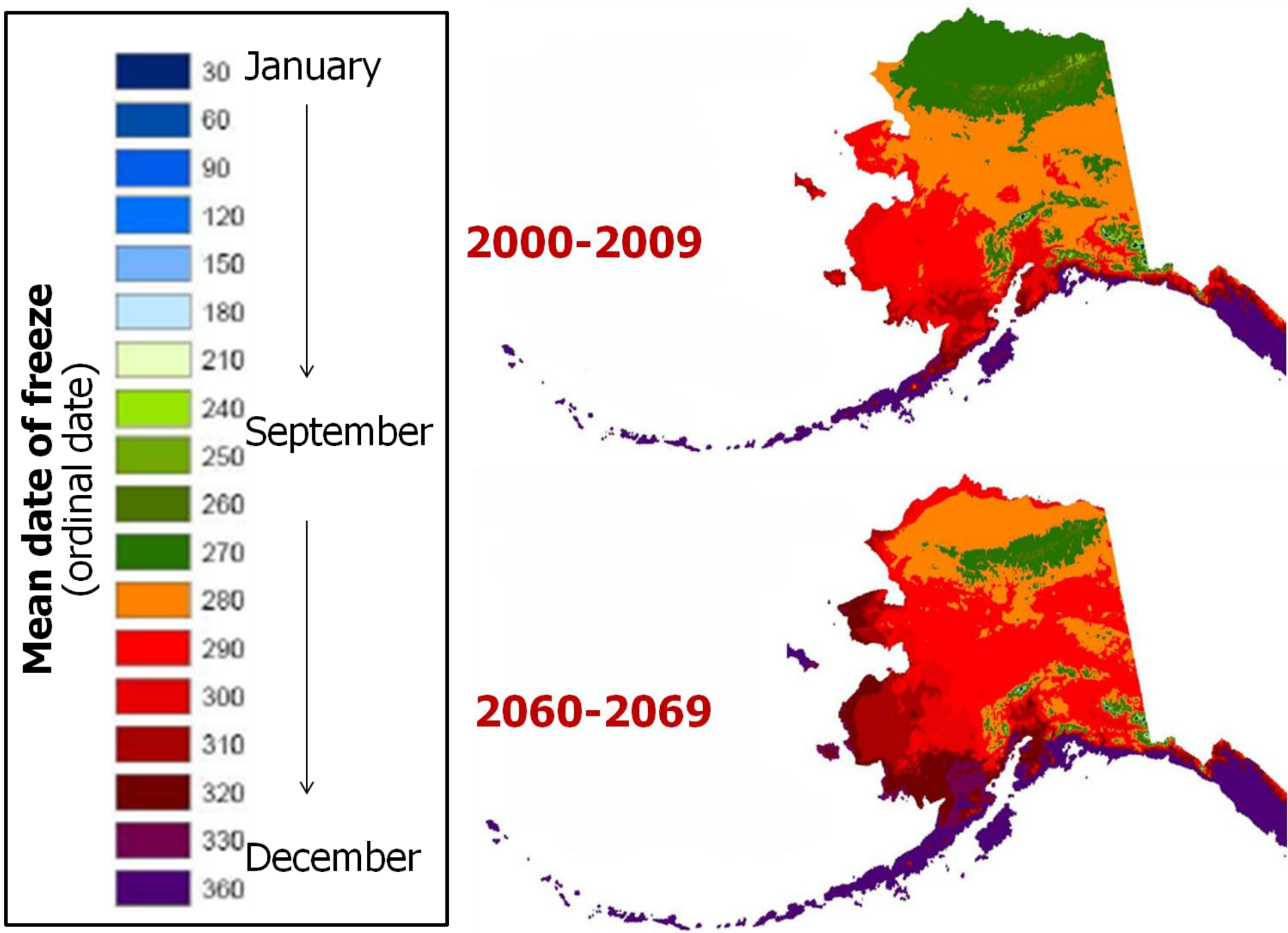


2060-2069

Mean precipitation (mm)
June-August

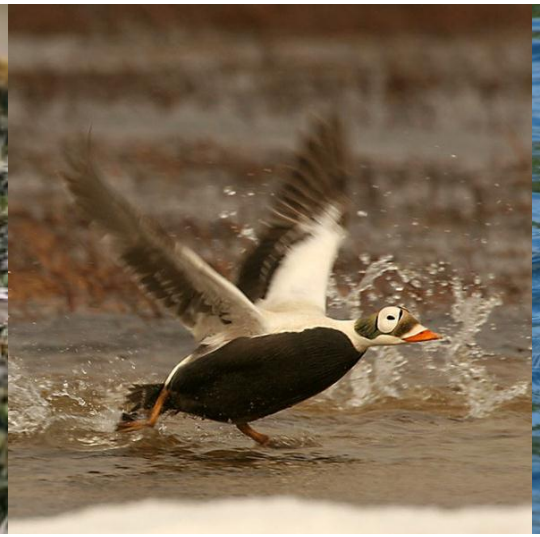


Scenarios Network for Alaska Planning
www.snap.uaf.edu/files/Map%20animations%20Jan09.pdf



Scenarios Network for Alaska Planning www.snap.uaf.edu/files/Map%20animations%20Jan09.pdf

How will hydrological changes on the Arctic Coastal Plain affect the forage base for migratory birds?



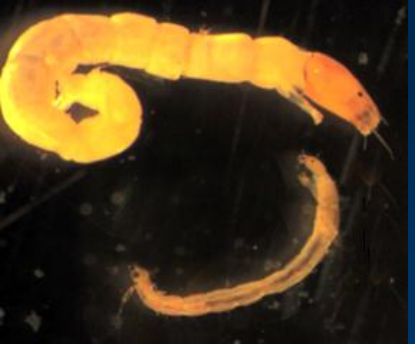
Tundra vegetation

Aquatic invertebrates

Fish, invertebrates

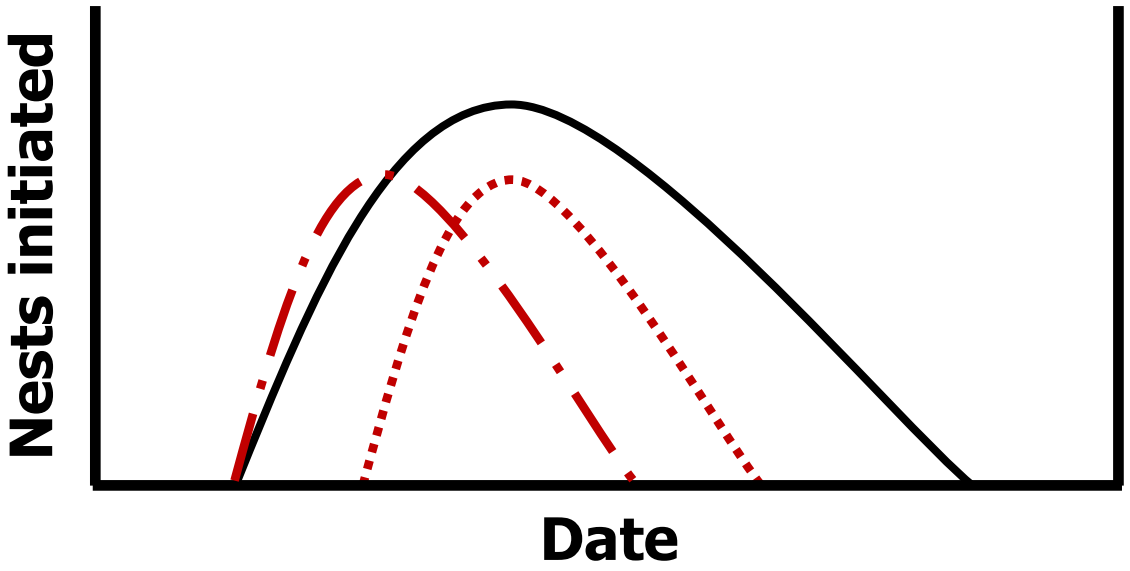
How will habitat changes on the Arctic Coastal Plain affect relationships between breeding shorebirds and their prey?

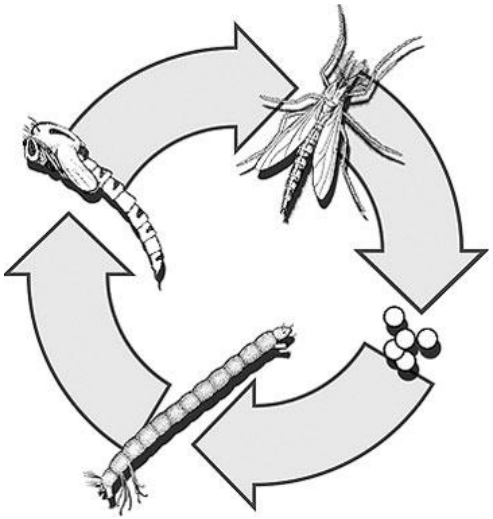
Research program has 3 key elements



1. Food habits of breeding shorebirds

Arctic Shorebird Demographics Network,
A. Lopéz, M. Wipfli, K. Gurney





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DNA-based fecal analysis is a powerful new tool for assessing diet

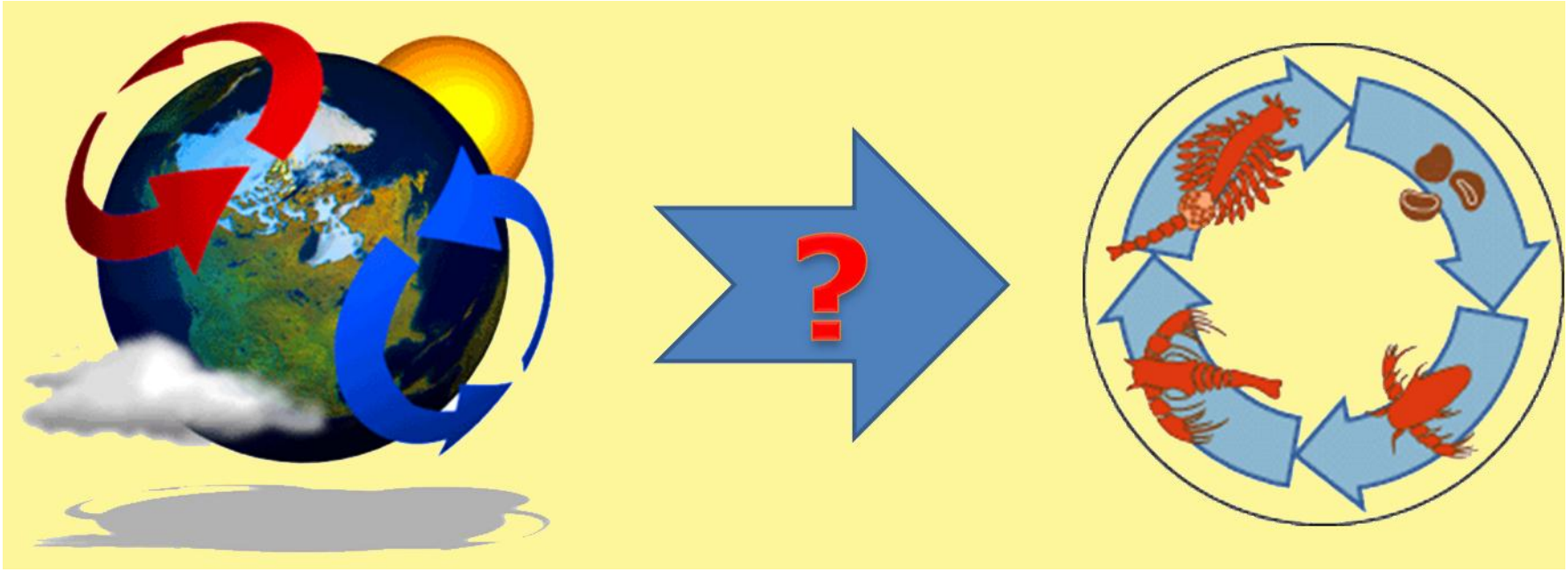
Reference databases

Extract → **Amplify** → **Sequence** → **Identify**

- increased taxonomic resolution
- circumvents limitations of stable isotope analyses

2. Changes in wetland invertebrate communities

K. Gurney, M. Wipfli, J. Koch



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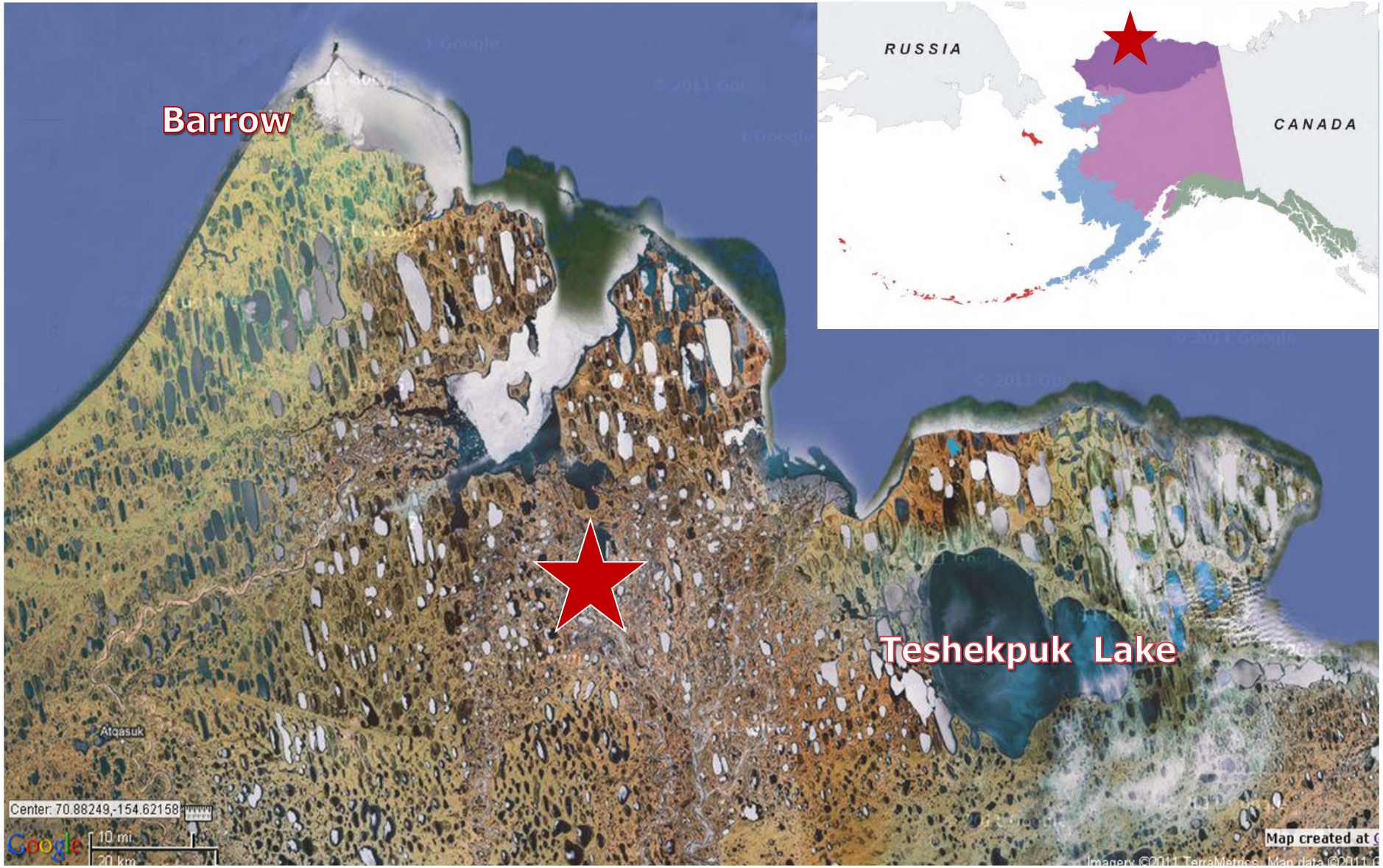
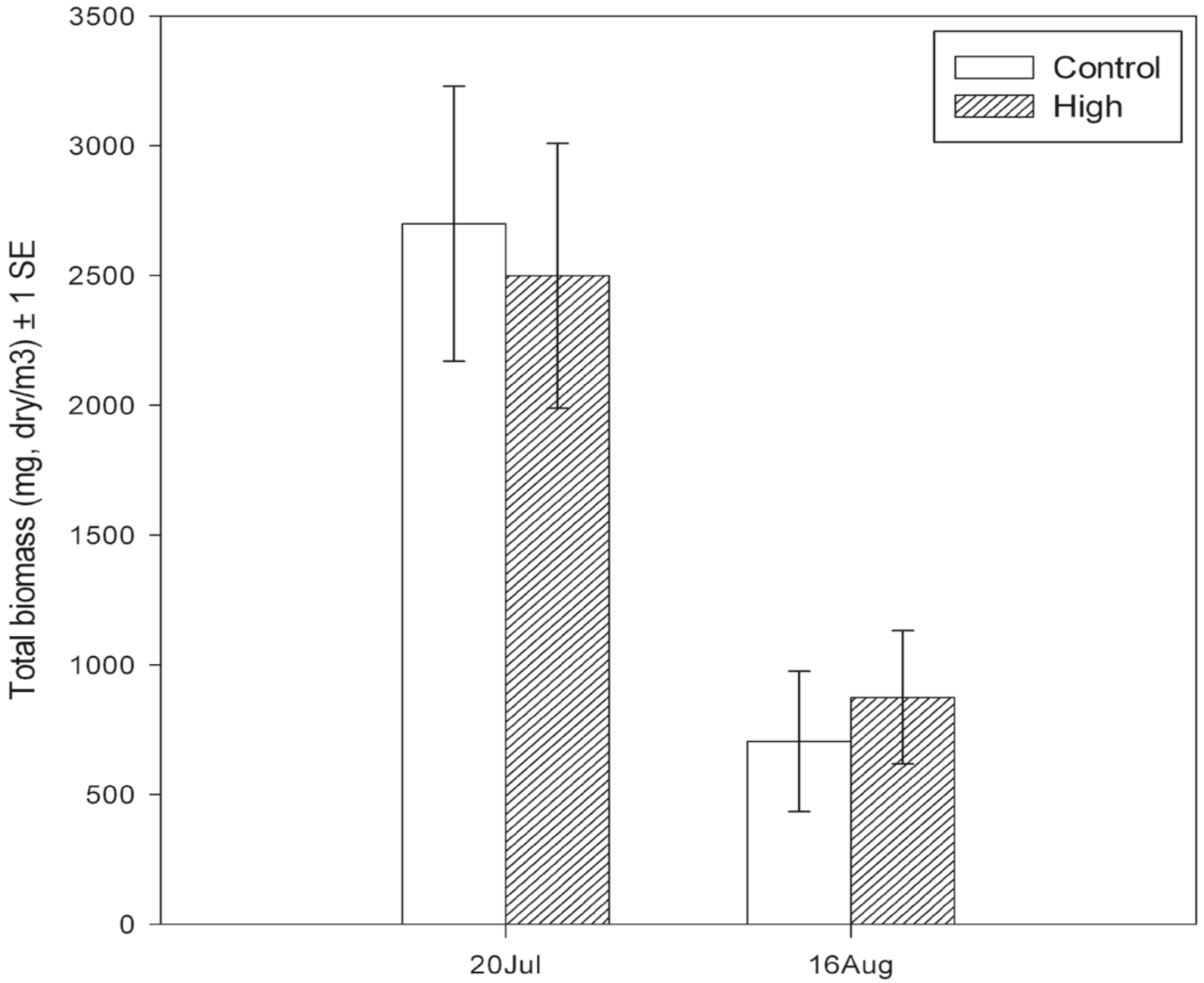
USGS science for a changing world

Field trials: manipulating nutrient concentrations and temperature



How will wetland biota on the Arctic Coastal Plain respond to climate change?

- primary productivity
- invertebrate communities (quantity, phenology, taxa)


Total biomass (mg, dry/m3) ± 1 SE
3500
3000
2500
2000
1500
1000
500
0
Control
High
20Jul
16Aug

3. Climate and timing of breeding

Arctic Shorebird Demographics Network, N. Smith, D. Ward, Wildlife Conservation Society, M. Wipfli, K. Gurney



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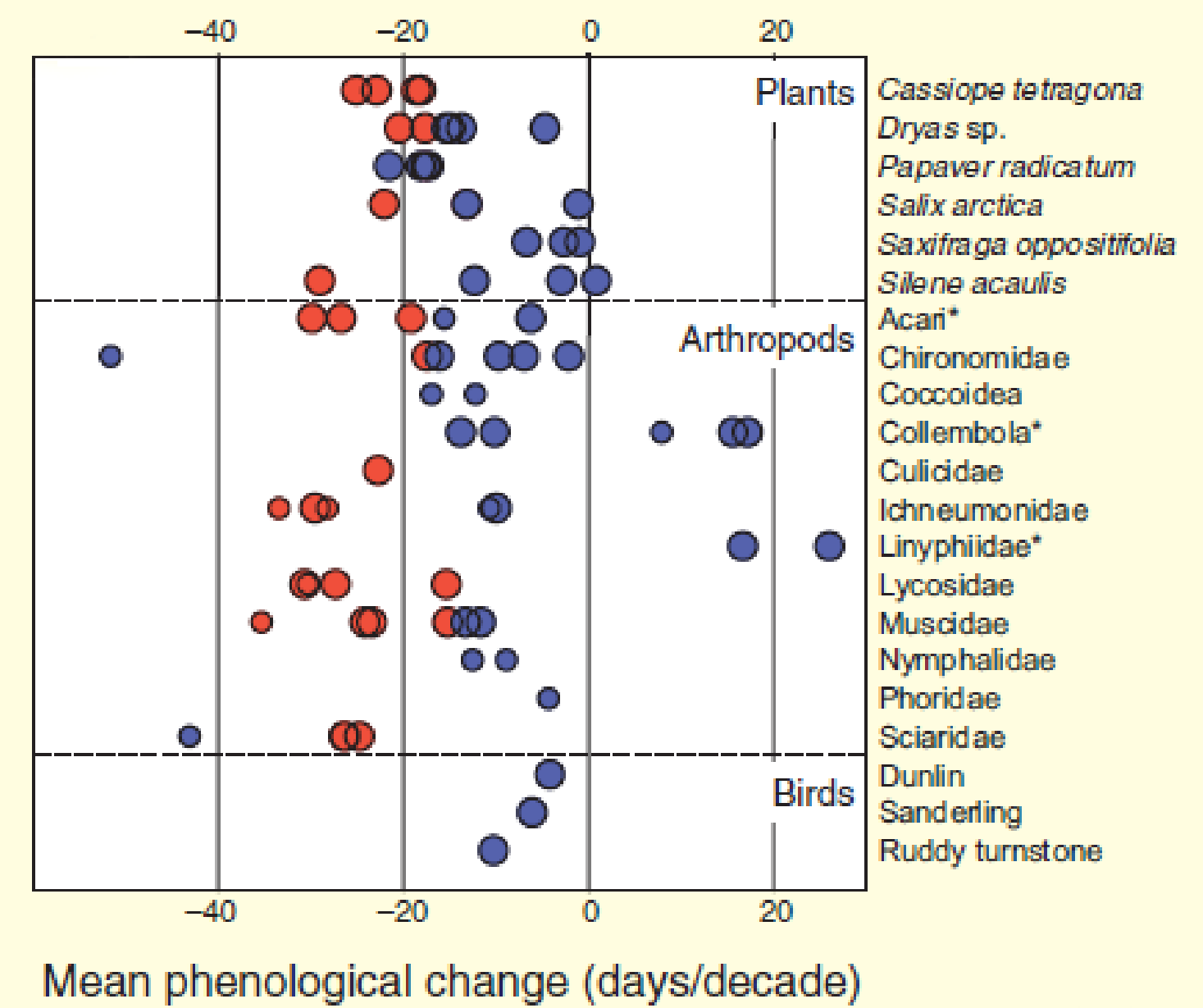
WILDLIFE CONSERVATION SOCIETY

What is the potential for trophic mismatch?



(Høye et al. 2007. Current Biology 17.)